vieworks

User Manual

Model : VC-4MC-M/C110
VC-4MC-M/C160

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Revision History

Revision	Date	Descriptions
1.0	2009. 10. 01	Initial release
1.2	2010/05/10	“ssp”,”stp” Command error correction and add “gmn” command (4.21 section)
1.3	2010.11.05.	New Name System

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1. Precautions

General

- Do not drop or damage the device.
- Do not disassemble, repair or alter the device.
- Do not let children touch the device without supervision.
- Do not use the device for any other purpose than specified.
- Contact your nearest distributor in case of trouble or problem.

Installation & Maintenance

- Do not install the device in a place subject to direct sun light, humidity, dust or soot.
- Do not place magnets near the product.
- Do not place the device next to heating equipments.
- Be careful not to let liquid like water, drinks or chemicals leak inside the device.
- Clean the device often to remove dust on it.
- In clearing, do not splash water on the device but wipe it out with smooth cloth or towel.

Power Supply

It is recommended the use of 12V DC with ±10% of voltage, over 1A of output current with KC, CE or other local certification. (※ Vieworks Co., Ltd. DO NOT provide power supplies with the devices.)
If voltage over 16V is supplied, it will cause damages to the device.

2. Compliance & Certifications

2.1. FCC Declaration

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expenses.

2.2. CE : DoC

EMC Directive 2004/108/EC.

Testing Standard EN 55022:2006+A1:2007, EN 55024:1998+A1:2001+A2:2003

Class A

3. Package Contents

Camera (1 unit)

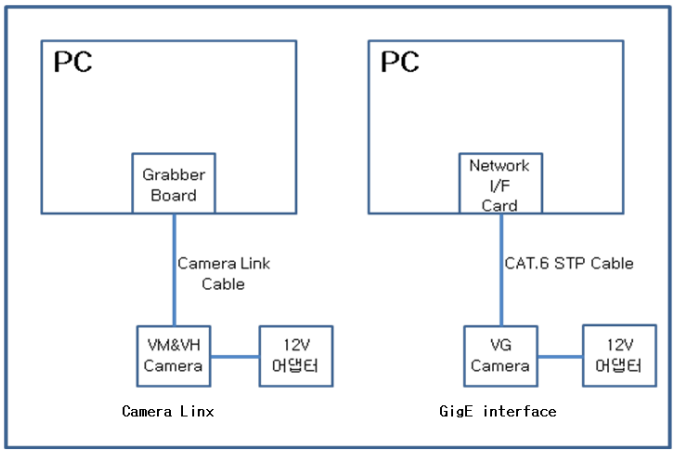
VC-4MC

Mount Plate (OPTION)

CD

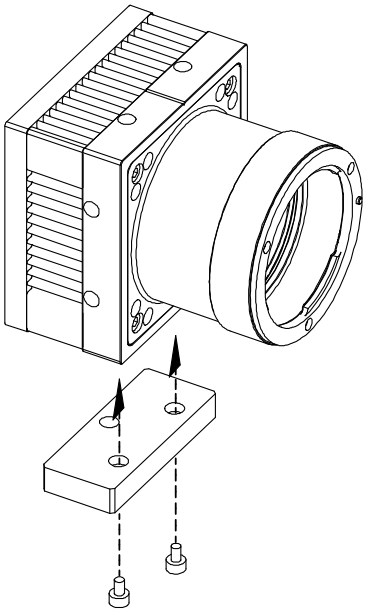
4. Installation

4.1.1. PC Connection



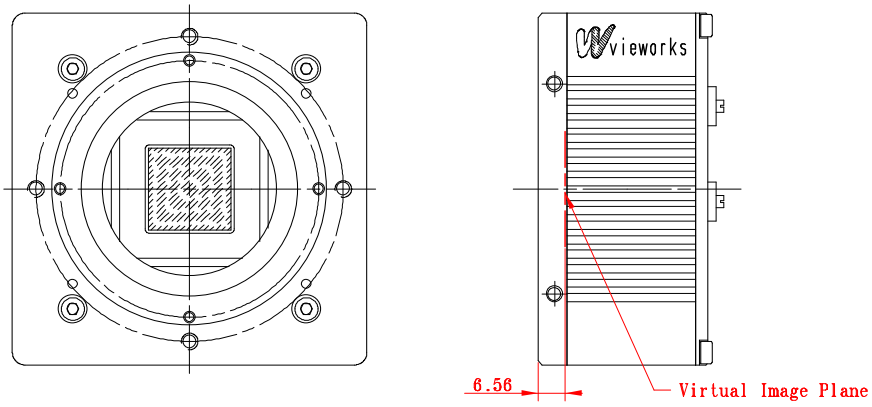
- Camera Link Cable Connection
- Power Cable Connection
- Control Cable Connection

4.1.2. Mount Plate



- The Mount Plate is provided as Option.
- The camera can be fixed without using this Mount Plate.

4.2. BFL (Back Focal Length)



5. Overview

VIEWORKS VC-4M is an industrial Area Scan Camera with high-speed frame using 4 mega pixel CMOS sensors. With its high reliability and durability, this camera is suitable for machine vision requiring high-speed continuous shooting.

Following are the basic function and features:

- Main Features
  - Fast four megapixel CMOS image sensor
  - high-speed shooting (At 4M full image, VC-4MC-M/C160 Model: 162 FPS , VC-4MC-M/C110 Model : 114 FPS)
  - Electronic exposure time control(Rolling shutter)
  - Overlap Trigger
  - Shading correction
  - Strobe Output
  - Output Channel – 2 Tap, 4 Tap, 8 Tap
  - Analog Gain / Offset Control
  - Defective Pixel Correction
  - Test Image
  - RS-644 Serial Communication
  - Temperature Monitor
  - Field Upgrade
  - Complies with the Camera Link standard

5.1. Specifications

Model	VC-4MC-M/C110	VC-4MC-M/C160
Image Sensor	Aptina MT9M440 CMOS Sensor (Known as the Micron MV40)	
Active Size	2352 X 1728 (4 Mega pixels)	
Pixel Size	7.0 μm × 7.0 μm	
Fill Factor	55%	
Quantum Efficiency	47% (λ = 610 nm)	
Imaging Area	H × V : 16.24 × 12.08 mm (Diagonal : 20.24 mm)	
Sensor Type	CMOS (Mono / Color)	
Frame Rate (at full Image)	2 Taps (Base) : 27 FPS 4 Taps (Medium) : 57 FPS 8 Taps (Full) : 114 FPS	8 Taps (Full) : 162 FPS
Transfer Time (at full Image)	2 Taps (Base) : 34 ms 4 Taps (Medium) : 17 ms 8 Taps (Full) : 8.5 ms	8 Taps (Full) : 6.19 ms
Dynamic Range	54 dB	56 dB
Exposure Control	Electronic rolling shutter	
Pixel Clock	60 MHz	85 MHz
Data Output	8 bit	
Trigger Input	Camera-Link : CC1 External Port: 3.3 – 5.0V Logic level input, optically isolated.	
Gain Control	Range: 0~ 12 dB, 64-step Analog Gain Control	
Offset Control	Range: 0 ~ 10 LSB, 64-step Analog Offset Control	
Mechanical Spec. (W×H×L), weight	53.8 mm x 90 mm x 90 mm, 460 g 53.8 mm x 90 mm x 90 mm, 500 g (With F-mount)	
Lens Mount	M42 Mount, F-Mount (optional)	
Power Requirements	12 VDC ± 20% MAX 5.0 W @ 12 V DC	
Operation Temperature	Case temperature : 0 ℃ ~ 50℃ Inner temperature : 0 ℃ ~ 60℃	
Connectors	Data Transfer/ Communication : Two, 26 pin, Female MDR connector Power : 6 pin, Hirose HR connector Control : 4 pin, Hirose HR connector	
Sensor Reset/Read Out Time	6.57 ms (at Full image)	6.19 ms (at Full image)

Table 5.1 Specifications of VC Series

5.2. Quantum Efficiency

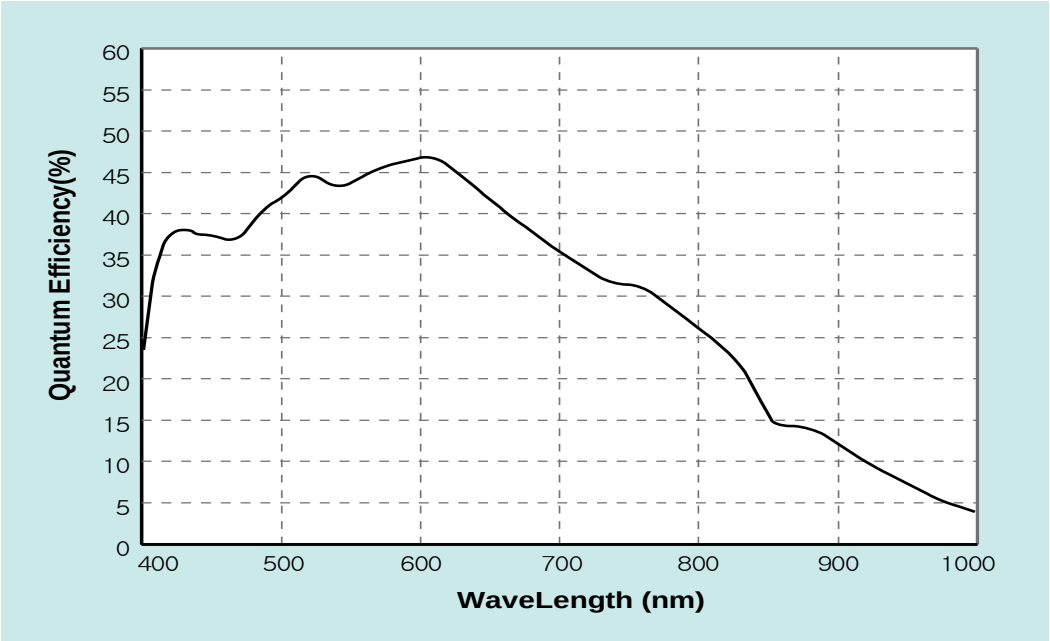


Fig. 5.1 Quantum Efficiency for monochrome sensor

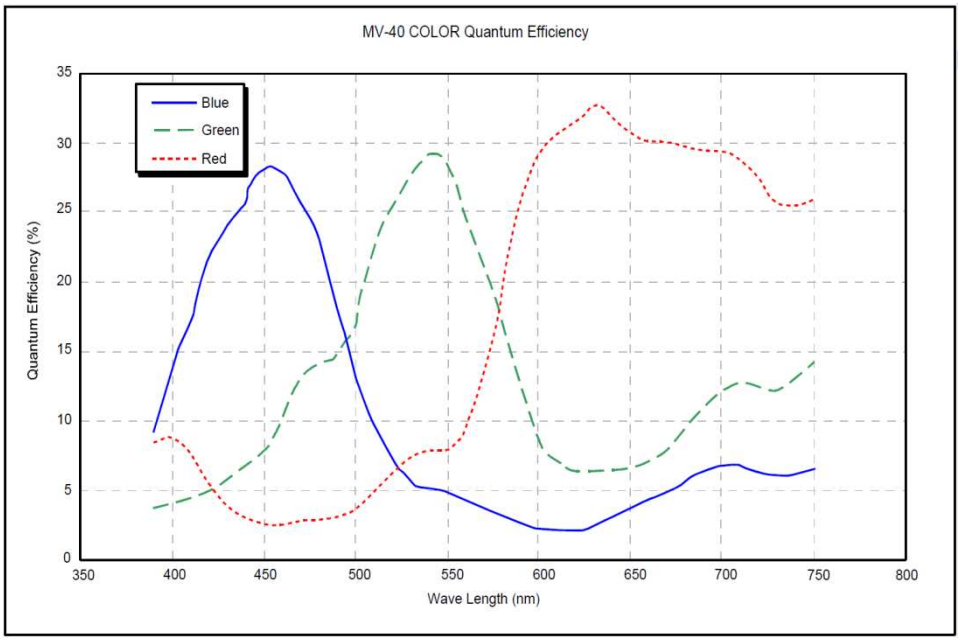


Fig. 5.2. Quantum Efficiency for Color Sensor

6. Camera Interface

6.1. General Description

As shown in the following figure, 3 types of connectors and status indicator LED are located on the back of the camera and have the functions as follows:

- 6 pin Power Input Connector : camera power input,
- 4 pin Control Connector : external trigger signal input and Strobe output
- 26 pin Camera-Link Connector : video data transmission, camera control
- Status LED : power and operation mode display

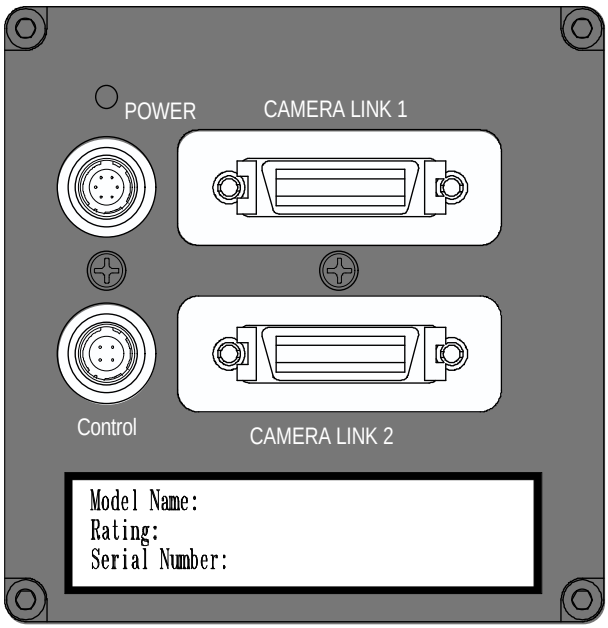


Fig. 6.1 VC-4M Series Connectors and LED

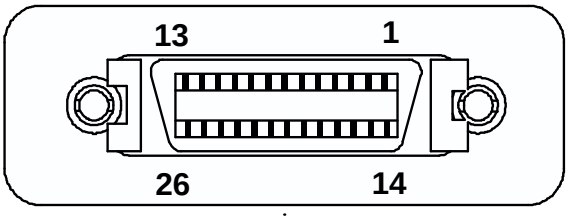


Fig. 6.2 Camera Link Connector

Camera output complies with Camera Link Standard and following list shows the pin configuration of connector.

PAIR List	Pin	Signal Name	Type	Description
PAIR 0	1	Ground	Ground	Cable Shield
	14	Ground	Ground	Cable Shield
PAIR 1	2	-X0	LVDS - Out	Camera Link Transmitter
	15	+X0	LVDS - Out	Camera Link Transmitter
PAIR 2	3	-X1	LVDS - Out	Camera Link Transmitter
	16	+X1	LVDS - Out	Camera Link Transmitter
PAIR 3	4	-X2	LVDS - Out	Camera Link Transmitter
	17	+X2	LVDS - Out	Camera Link Transmitter
PAIR 4	5	-X3	LVDS - Out	Camera Link Transmitter
	18	+X3	LVDS - Out	Camera Link Transmitter
PAIR 5	6	-XCLK	LVDS - Out	Camera Link Transmitter
	19	-XCLK	LVDS - Out	Camera Link Transmitter
PAIR 6	7	- SerTC	LVDS - In	Serial Data Receiver
	20	+ SerTC	LVDS - In	Serial Data Receiver
PAIR 7	8	- SerTFG	LVDS - Out	Serial Data Transmitter
	21	+ SerTFG	LVDS - Out	Serial Data Transmitter
PAIR 8	9	- CC 1	LVDS - In	Software External Trigger
	22	+ CC 1	LVDS - In	Software External Trigger
PAIR 9	10	N/C	N/C	N/C
	23	N/C	N/C	N/C
PAIR 10	11	N/C	N/C	N/C
	24	N/C	N/C	N/C
PAIR 11	12	N/C	N/C	N/C
	25	N/C	N/C	N/C
PAIR 12	13	Ground	Ground	Cable Shield
	26	Ground	Ground	Cable Shield

Table 6.1 Pin Assignments for Camera Link Connector 1

PAIR List	Pin	Signal Name	Type	Description
PAIR 0	1	Ground	Ground	Cable Shield
	14	Ground	Ground	Cable Shield
PAIR 1	2	-Y0	LVDS - Out	Camera Link Transmitter
	15	+Y0	LVDS - Out	Camera Link Transmitter
PAIR 2	3	-Y1	LVDS - Out	Camera Link Transmitter
	16	+Y1	LVDS - Out	Camera Link Transmitter
PAIR 3	4	-Y2	LVDS - Out	Camera Link Transmitter
	17	+Y2	LVDS - Out	Camera Link Transmitter
PAIR 4	5	-Y3	LVDS - Out	Camera Link Transmitter
	18	+Y3	LVDS - Out	Camera Link Clock Tx
PAIR 5	6	-YCLK	LVDS - Out	Camera Link Channel Tx
	19	+YCLK	LVDS - Out	Camera Link Channel Tx
PAIR 6	7		Not Used	Connected with 100 ohm
	20		Not Used	
PAIR 7	8	-Z0	LVDS - Out	Camera Link Transmitter
	21	+Z0	LVDS - Out	Camera Link Transmitter
PAIR 8	9	-Z1	LVDS - Out	Camera Link Transmitter
	22	+Z1	LVDS - Out	Camera Link Transmitter
PAIR 9	10	-Z2	LVDS - Out	Camera Link Transmitter
	23	+Z2	LVDS - Out	Camera Link Transmitter
PAIR 10	11	-Z3	LVDS - Out	Camera Link Transmitter
	24	+Z3	LVDS - Out	Camera Link Clock Tx
PAIR 11	12	-ZCLK	LVDS - Out	Camera Link Channel Tx
	25	+ZCLK	LVDS - Out	Camera Link Channel Tx
PAIR 12	13	Ground	Ground	Cable Shield
	26	Ground	Ground	Cable Shield

Table 6.2 Pin Assignments for Camera Link Connector 2

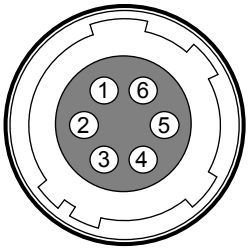
Model	Camera-Link Output Mode	Camera-Link Configuration	Camera-Link Connector 1	Camera-Link Connector 2
VM-4M110C-M/C	2 Tap's	BASE	O	X
	4 Tap's	MEDIUM	O	O
	8 Tap's	FULL	O	O
VM-4M160C-M/C	8 Tap's	FULL	O	O

Table 6.3 Connector Connection per Camera Link Output Mode

If Camera Link output is set to 2Tap's (Base) in VC-4MC-M/C110 Model, transmission and reception of all data are carried out through Camera Link connector 1 and it is not required to connect the cable to Connector 2. In connecting the connector to Frame Graber, it is required to be careful of sequence of Camera Link Connector. If the sequence is changed, camera image output and serial communication do not work properly.

6.2. Power Input Connector

Power input connector of camera is Hirose 6 pin connector(part # HR10A-7R-6PB). Pin arrangement and configuration are as follows:



< Pin Arrangement of Power Input Connector >

Pin Number	Signal	Direction	Function
1, 2,3	+ 12V DC	Input	DC Power Input
4,5,6	DC Ground	Input	DC Ground

Table 6.4 Pin Configuration of Power Input Connector

Power plug can be configured using the Hirose 6 pin plug (part # HR10A-7P-6S) or compatible parts enclosed in the camera box. For power supply, it is recommended to use the power adapter twith over 1A current output at 12VDC ±10% voltage output.

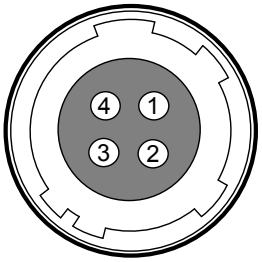
- Cautions for Power Input

Make sure to connect the power wiring of camera after checking the camera input power is turned off. If not, it may result in damage of camera.

If the voltage over 16V is applied beyond the power voltage input of camera, circuit inside camera can be damaged.

6.3. Control Connector

The control connector used is Hirose 4 pin connector(part # HR10A-7R-4S) and consists of external trigger signal input and strobe output port. Pin arrangement and configuration are as follows:



< Pin Arrangement of Control Connector >

Pin Number	Signal	Direction	Function
1	Trigger Input +	Input	
2	Trigger Input -	Input	
3	DC Ground	-	DC Ground
4	Strobe Out	Output	3.3V TTL Output Output resistance : 47 Ω

Table 6.5 Pin Arrangement of Control Connector

Matching plug connector can use Hirose 4 pin plug(part # HR10A-7P-4P) or equivalent connector.

6.3.1. Trigger Input Circuit

Following figure shows trigger signal input circuit of 4 pin connector. Trigger signal entered is delivered to internal circuit through photo coupler. Minimum trigger width that can be recognized at camera is 1us. If trigger signal entered is less than 1us, trigger signal is ignored in camera. External trigger signal can approve signals to the circuits in the 2 methods shown below.

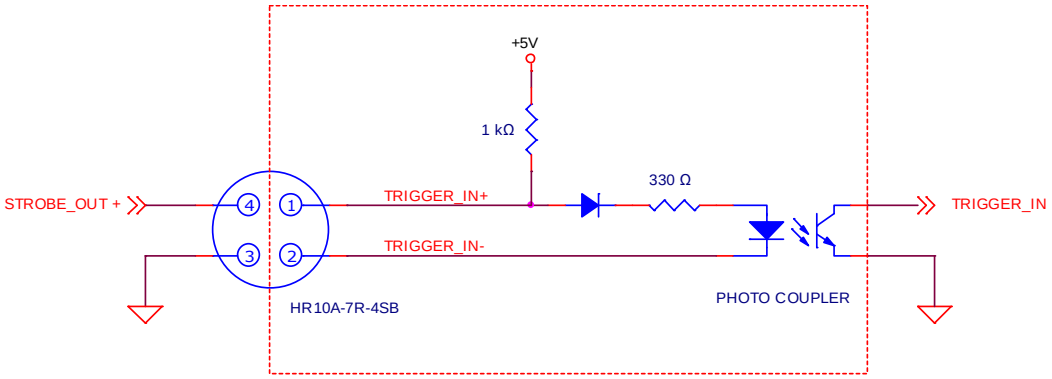


Fig. 6.3 Trigger Input Schematic

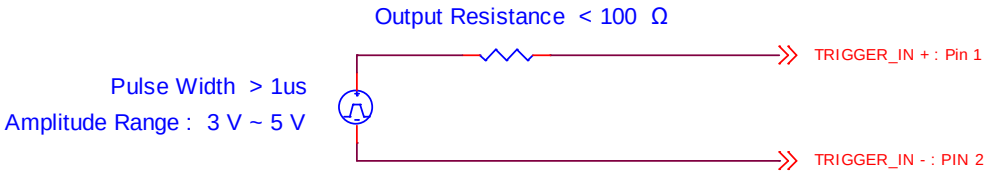


Fig. 6.4 Recommended Pulse Trigger Driver Input

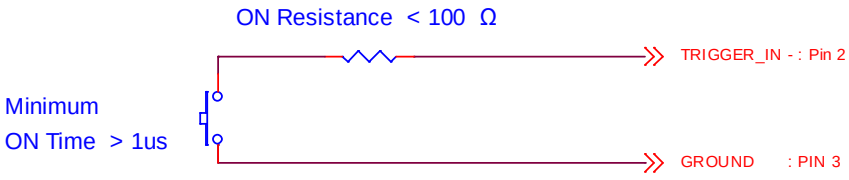


Fig. 6.5 Recommended Contact Trigger Input

6.3.2. Strobe Output Circuit

Strobe output signal is output through TTL Driver IC of 3.3 V output level and pulse width of signal is output in synchronization with exposure of camera.

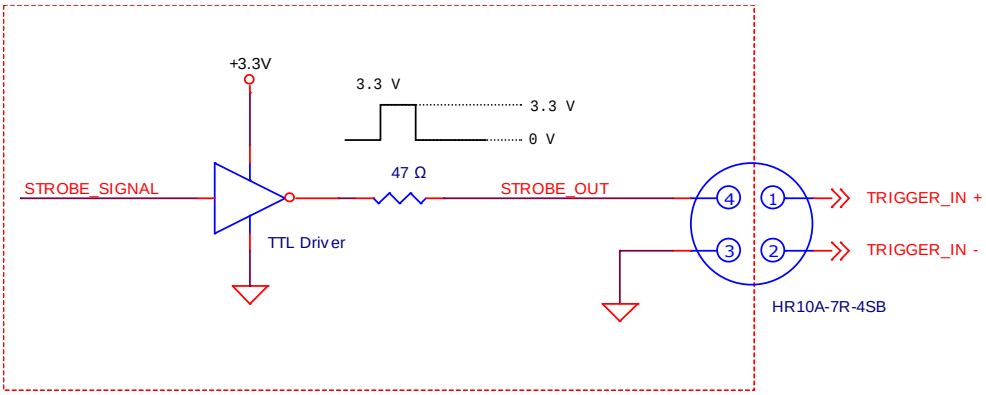


Fig. 6.6 Schematic Strobe Output

7. Camera Features

7.1. Exposure

CMOS sensor of Rolling Shutter type shows sequential reset in the line unit according to timing signal, different from Global Shutter type that resets the pixels in all areas of frame. Following timing diagram displays CMOS Reset and Exposure, Readout process. Readout is the process of reading photoelectron signal accumulated in each pixel and performs the readout sequentially from the first line same as in reset section. Reset and Readout section are same in terms of time so that exposure time of pixel for each line is same too. However, since the point of time where exposure starts differs for each line, image distortion may occur by the time difference in the lower part of image from the upper power if fast moving object is shot without strobe device. Table 5.1 shows Reset / Readout time for 2 VC series models.

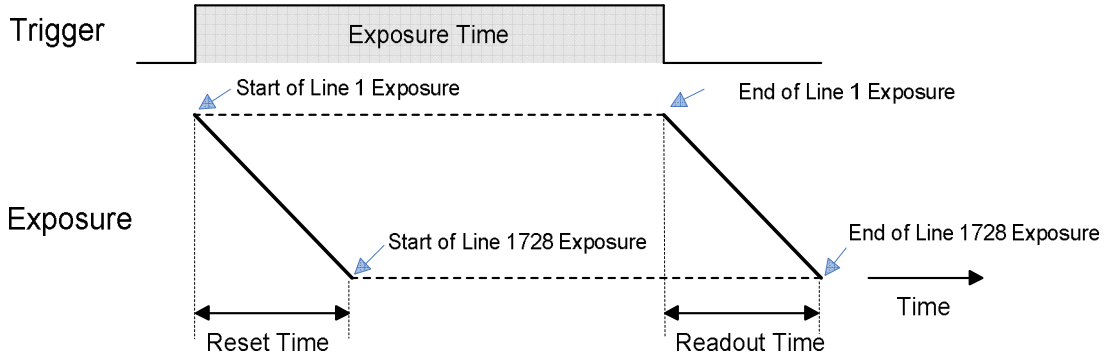


Fig. 7.1 Exposure Timing Diagram

Model	VC-4MC-C/M110	VC-4MC-M/C160
Reset / Readout Time	6.57 ms	6.19 ms

Table 7.1 Reset / Readout Time (in Full Image) per Model

7.2. Trigger Mode

Trigger mode of camera is divided into Free-Run mode where image is synchronized to Internal Trigger signal created inside camera, and External Sync mode where image is synchronized to the trigger signal entered in external port.

7.2.1. FreeRun Mode

In FreeRun mode, the cycle of internal trigger signal is determined by Transfer Time (1 Frame data transmission time) and Exposure setting value, and image is obtained with such periodic signal. Cycle of internal signal, that is, Frame Rate, is determined with the following 2 conditions.

- Case 1 : Exposure Time < Frame Transfer time
  - ➔ Frame Rate(FPS) = 1/ Frame Transfer Time (sec) : has fixed value
- Case 2 : Exposure Time > Frame Transfer time
  - ➔ Frame Rate(FPS) = 1 / Exposure Time (sec) : change depending on Exposure Time value.

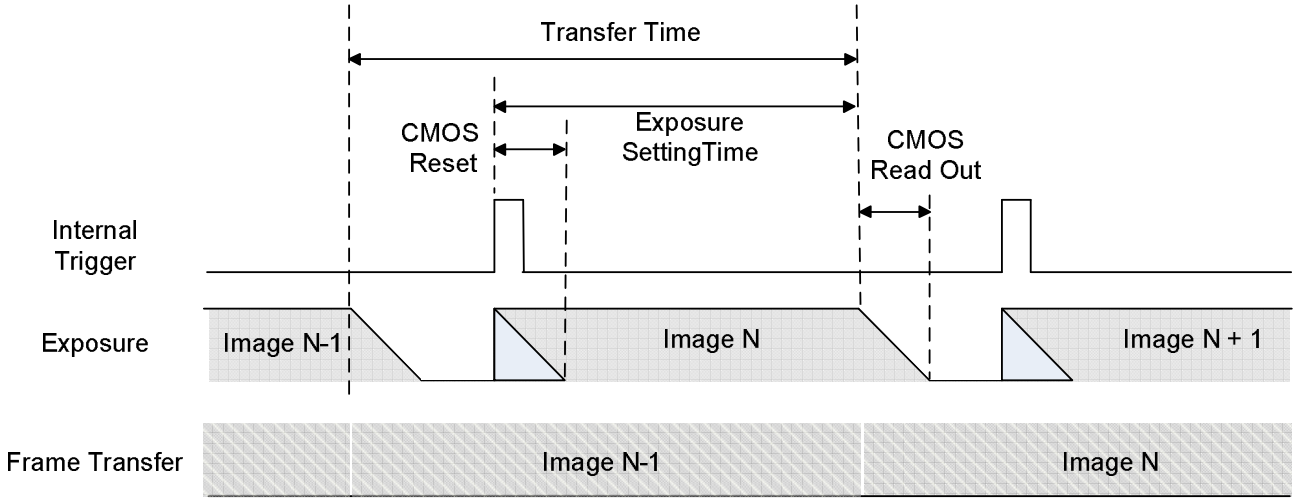


Fig. 7.2 Exposure Time is Shorter than Readout Time

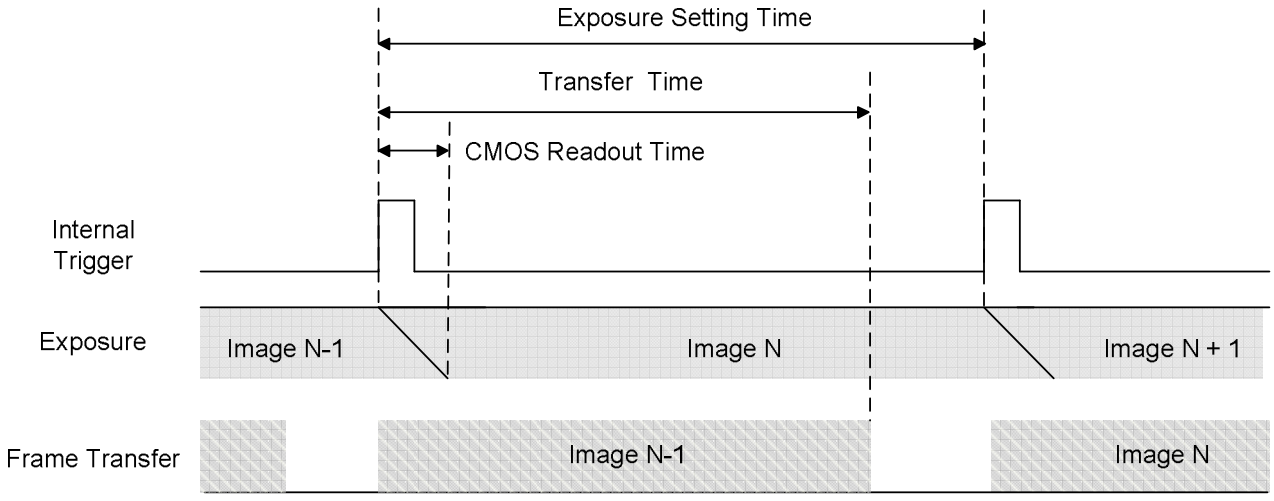


Fig. 7.3 Exposure Time is longer than Readout Time

7.2.2. External Sync Mode

In External Sync Mode, camera keeps standby status until trigger signal is entered and performs image transmission (Frame Transfer) after exposure process if trigger input occurs as shown in Fig. 7.4. To operate camera in External Sync mode, it is required to set Trigger Source regarding which input, CC1 input port or External Trigger port, will be used for trigger signal, as well as Polarity and Exposure source of signal entered.

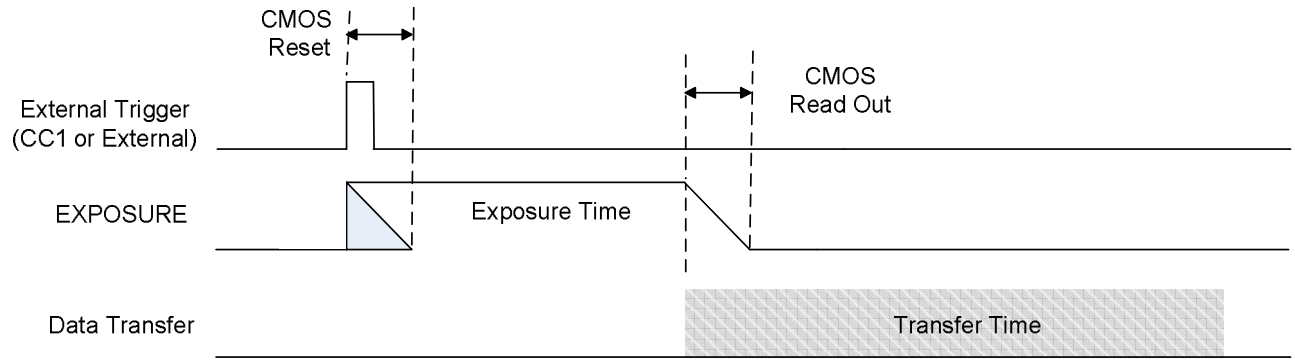


Fig. 7.4 External Sync Mode

Following is the summary of basic setting items.

- Trigger Source : select either of CC1(Camera Control Port 1) and External Connector as source of external trigger input signals.
- Trigger Polarity : set whether polarity of Trigger signal entered is Active High or Active Low.
- Exposure Source : select to synchronize exposure time with pulse width of trigger input signal or with exposure time programmed inside the camera.

7.2.2.1. Overlap trigger input

When trigger input occurs in the course of Frame Transfer and Fig. 7.5, it simultaneously performs exposure of next image for new trigger input. In this case, image shooting is possible up to the speed of 1/Transfer Time(sec), the maximum FrameRate conditions regardless of exposure time.

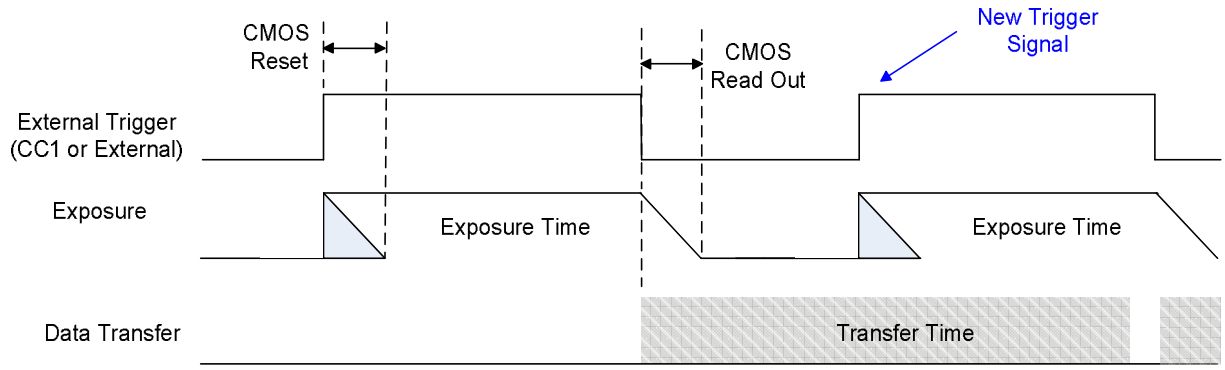


Fig. 7.5 Camera Operation at Input of Overlap Trigger

Following list shows the operation of camera on exceptional trigger input.

- When the trigger signal with cycle faster than maximum FrameRate conditions, next Frame Transfer is performed while one Frame Transfer is not completed, failing to obtain overall image.
- When new trigger input occurs in Exposure section while Exposure Source is set in Program, the signal is ignored. It is the case that exposure setting value is set longer than trigger input cycle, and since it is not synchronized for all trigger signal entered in camera, Frame Rate gets slower than Trigger input cycle.

7.3. Camera Link Output

VC-4MC-M/C110 model supports 2 Tap, 4 Tap and 8 Tap output modes according to user interface. Tap setting value means the number of pixel data output for each cycle of Pixel Clock, and speed of Frame Data transmission varies depending on tap setting. Frame Data is output in interleaved type and as shown in Fig.2.21. This function is applied only to VC-4MC-M/C110 model, and function can be set using “scl” command.

VC-4MC-M/C160 model can support 8 Tap output mode only.

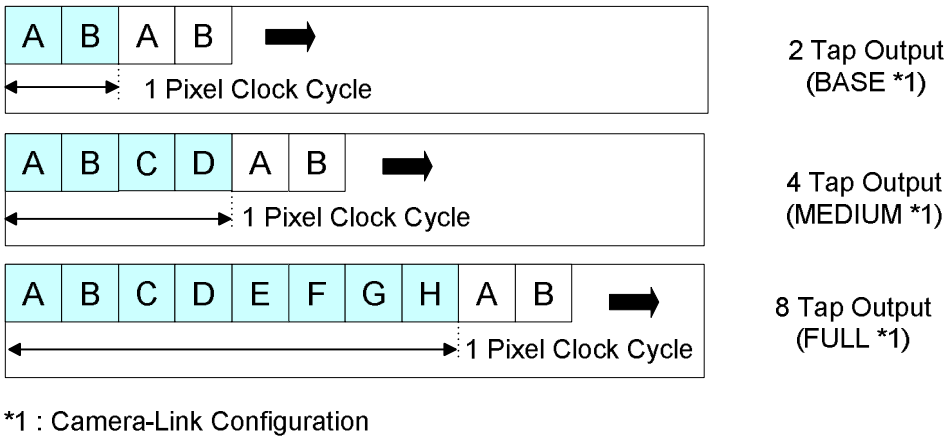


Fig. 7.6 Camera Link Output Mode

7.4. Gain and Offset

CMOS sensor in camera has a total of 2352 ADC(Analog to Digital Converter), one for each column. Gain and Offset can be changed through Voltage Reference adjustment applied commonly to all ADCs. Gain adjustment scope can be set between 0 ~ 12 dB and setting value has values in 64 stages. Relation between setting value and actual Gain(dB) are as shown below:

Gain(dB) = (setting value) x 0.19dB

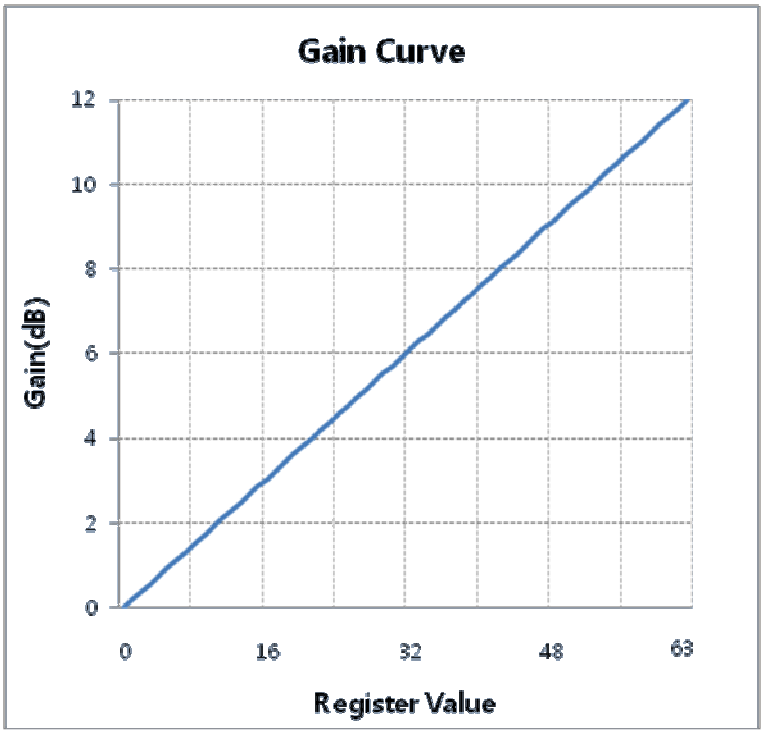


Fig. 7.7 Register Setting vs Gain

Offset can be set between 0 ~ 10 (LSB) based on 8 bit Data output and setting value has a total of 64 stage value.

7.5. Temperature Monitor

Camera has sensor chip for monitoring internal temperature. “gct” command is used to check the temperature of camera.

7.6. Status LED

Green LED on back of camera shows the operation status of camera. LED status and camera status corresponding to this are as follows:

- **Continuous ON Status** – camera operates in Free-Run Mode
- **ON for 0.5 sec. and OFF for 0.5 sec. repeats** – camera operates in Trigger Mode.
- **ON for 1 sec. and OFF for 1 sec. repeats** – Test Image is output.
- **ON for 0.25 sec. and OFF for 0.25 sec. repeats** – operates in Trigger Mode and Test Image is output

7.7. Test Image

It can be set to output test image created inside instead of image data output from image sensor, in order to check normal operation of camera. 3 types of test image are available; image with different values in horizontal direction (Fig. 7.8), images with different values in diagonal direction (Fig. 7.9), and moving image with different values in diagonal direction (Fig. 7.10). Test image can be applied to all operation modes of camera and set using “sti” command.

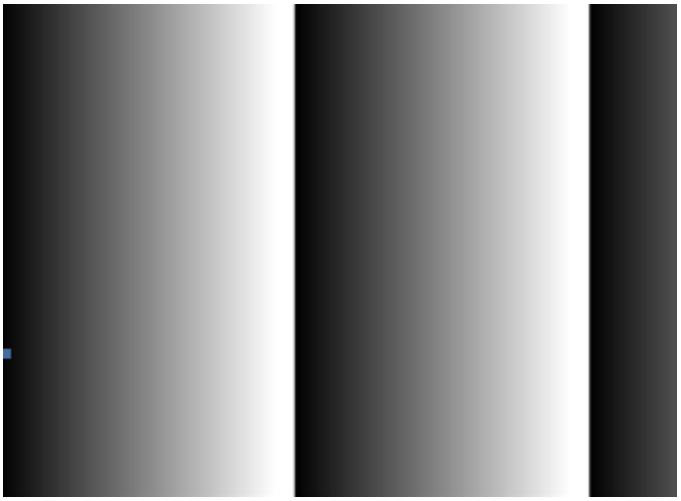


Fig. 7.8 Test Image 1

Fig. 7.9 Test Image 2

Fig. 7.10 Test Image 3 (Moving Pattern)

7.8. Strobe

Strobe output is the function to output the signal synchronized to exposure section of camera in operation, to External Port. Strobe output type and Strobe Polarity can be set in VC camera.

7.8.1. Strobe Output Type

Strobe Output Type is available in Wide Type and Narrow Type. Wide Type outputs the signal synchronized with overall sections where exposure occurs from the point of sensor reset to the completion of sensor Readout, while Narrow Type outputs the signal synchronized to section where all pixels are accumulated in exposure section. “sst” command is used to set Strobe Type.

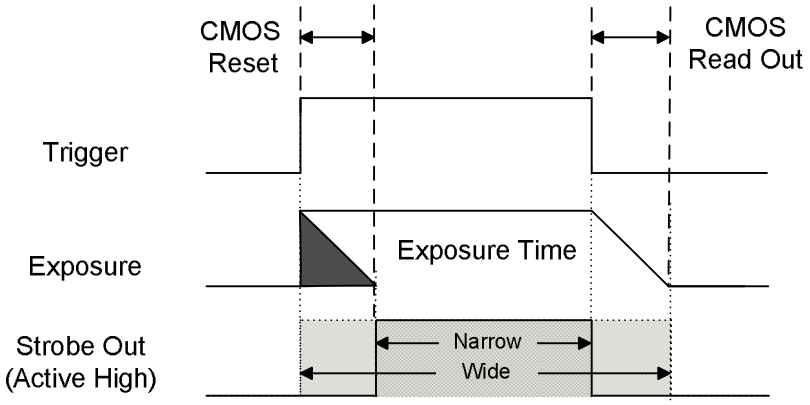


Fig. 7.11 Strobe signal at Trigger Mode

7.8.2. Strobe Polarity

Polarity can be set fur Strobe signal output. “ssp” command is used to set the polarity of strobe signal.

7.9. Field Upgrade

This camera has the function to upgrade firmware and FGPA logic through RS-644 interface of CameraLink, rather than disassembly of camera in the field. See Appendix A for how to change in details.

7.10. Dark Image Correction

Fixed Pattern Noise of CMOS sensor varies depending on operating temperature of camera due to change in features according to temperature of ADC and sensor cell It may result in lower sensitivity at Dark Level. Sensitivity change due to temperature change is less than 1 dB/10 degree. The variation due to temperature change is not big and acquisition condition of corrected data is 25 degree based on case temperature. For optimization of user to environmental conditions, it is recommended to correct after the temperature of camera case gets stabilized while camera is installed.

- **Correction Sequence of Camera Dark Image**

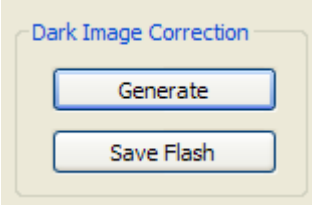


Fig. 7.12 Items of Dark Image Correction at Configurator

- How to Correct Image using Configurator

1. Prevent penetration of light into camera image sensor.
2. Click “Generate” button in “Dark Image Correction” item of “View” tab to generate correction data.
3. Click “Save Flash” button of “Dark Image Correction” item of “View” tab to save correction data in the flash memory.

- How to Correct Image using Serial Command

1. Prevent penetration of light to camera image sensor.
2. Use terminal command “gcp” to generate correction data in camera.
3. Use terminal command “scp” to save correction data in flash memory.

8. Serial Communication

8.1. Setup command

All setup in camera is carried out RS-644 serial interface of camera link. With the following communication setting, it can be controlled using terminal or direct control at user application.

- BOUD Rate : 19200 bps
- Data Bit : 8 bit
- Parity Bit : No Parity
- Stop bit : 1 stop bit
- Flow control : None

All types of camera setting commands except Firmware Download, requiring massive data transmission are delivered in ASCII command type. All camera setup commands start from user application and the camera returns the response(“OK”, “Error” or information) for command The camera informs the completion of command execution through response with write command, while the camera returns the error response or information with read command.

Command format

<command> <parameter1> <parameter2> <cr>

0~2 parameters follow the command.

Response:

- If execution of write command is successfully completed

OK <cr> <lf>

- If execution of read command is successfully completed

<parameter1> <cr> <lf>

- If execution of command is not completed

Error : <Error Code> <cr> <lf>

Types of Error Code

0x80000481 : values of parameter not valid

0x80000482 : number of parameter is not matched

0x80000484 : command that does not exist

0x80000486 : no execution right

8.2. Parameter Storage Space

The camera has 3 non-volatile storage space used for parameter storage and 1 volatile work space that is applied to actual camera operation. 3 storage space is divided into Factory Space that contain basic value at the factory, and 2 user space(User Space 1, User Space 2) that can save parameter value temporarily set by the user. User space can be read and written, but Factory space can be read only.

At camera booting, setting value in one of 3 storage spaces is copied to work space according to Config Initialization value and value of the space is used for camera setting. Since values in work space is valid only while the power is on, it should be copied to user space 1 or user space 2 using “sct” command.

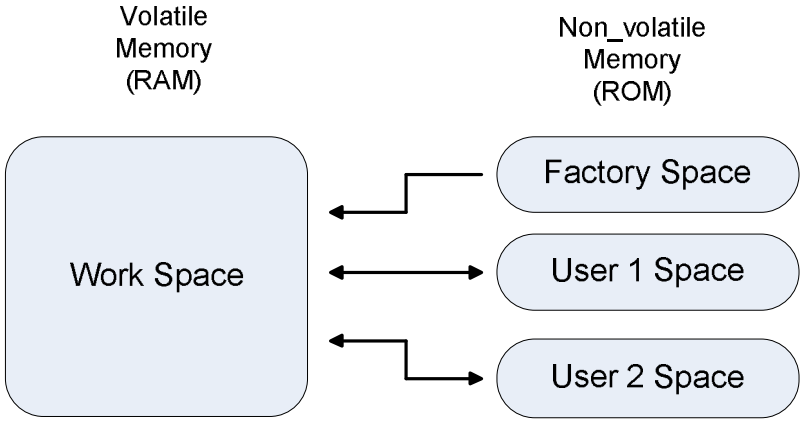


Fig. 8.1 parameter Area

8.2.1. Command List

Command	Syntax	Value Returned	Description
Help	h	String	Displays a list of all commands
Set Camera-Link Mode **Get Camera-Link Mode**	scl 0|1|2 gcl	OK 0|1|2	0 : 2 Tap's Output 1 : 4 Tap's Output 2 : 8 Tap's Output
Set Trigger Mode **Get Trigger Mode**	stm 0|1 gtm	OK 0|1	0 : Free Run Mode 1 : Trigger/Overlap Mode
Set Trigger Source **Get Trigger Source**	sts 1|2 gts	OK 1|2	1 : CC1 Port Input 2 : External Input
Set Trigger Polarity **Get Trigger Polarity**	stp 0|1 gtp	OK 0|1	0 : Active Low 1 : Active High
Set Exposure Time **Get Exposure Time**	set n get	OK N	n : Exposure Time in us (Setting range : 10 ~ 7,000,000 us)
Set Analog Gain **get Analog Gain**	sag n gag	OK n	n :Analog Gain Parameter (Setting Range : 0 ~ 63)
Set Analog Offset **get Analog Offset**	sao n gao	OK n	n :Analog Gain Parameter (Setting Range : 0 ~ 63)
Set Test Image **Get Test Image**	sti 0|1|2|3 gti	OK 0|1|2|3	0 : OFF 1,2 : Fixed Pattern Image 3 : Moving Pattern Image
Set Strobe Type **Get Strobe Type**	sst 0|1 gst	OK 0|1	0 : Narrow Output 1 : Wide Output
Set Strobe Polarity **Get Strobe Polarity**	ssp 0|1 gsp	OK 0|1	0 : Active Low 1 : Active High
Get Current Temperature	gct	String	Display Temperature Value

Command	Syntax	Value Returned	Description
Save Config To	sct 1|2	OK	1 : Save to User 1 Setting 2 : Save to User 2 Setting
Load Config From	lcf 0|1|2	OK	0 : Load from Factory Setting 1 : Load from User 1 Setting 2 : Load from User 2 Setting
Set Config Initialization **Get Config Initialization**	sci 0|1|2 gci	OK 0|1|2	0 : Load from Factory Setting when initializing 1 : Load from User 1 Setting when initializing 2 : Load from User 2 Setting when initializing
Get Model Name	gmn	String	Displays Model Name
Get MCU Version	gmv	String	Displays MCU Version
Get FPGA Version	gfv	String	Displays FPGA Version
Get Serial Number	gsn	String	Display Serial Number

8.3. Configurator GUI

8.3.1. Camera Scan

When you execute the program while the camera is turned on, Camera Scan window appears as shown in Fig. 8.1. At this time, the program checks serial port of computer and DLL provided by cameralink to scan whether the camera is connected. If there is a camera connected, it displays model name on the screen. If the camera is not properly displayed on the screen, check the connection of cable with power of camera and press refresh button. When you double-click model name displayed on the screen, Configurator is executed and displays current setting value of camera connected.

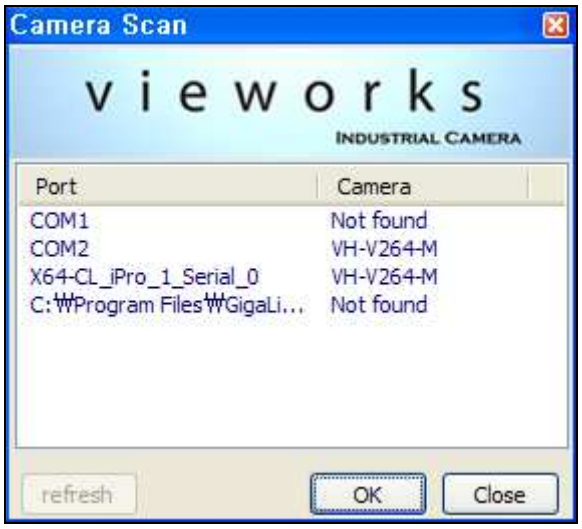


Fig. 8.1 Camera Configurator Loading Window

8.3.2. Menu

8.3.2.1. File

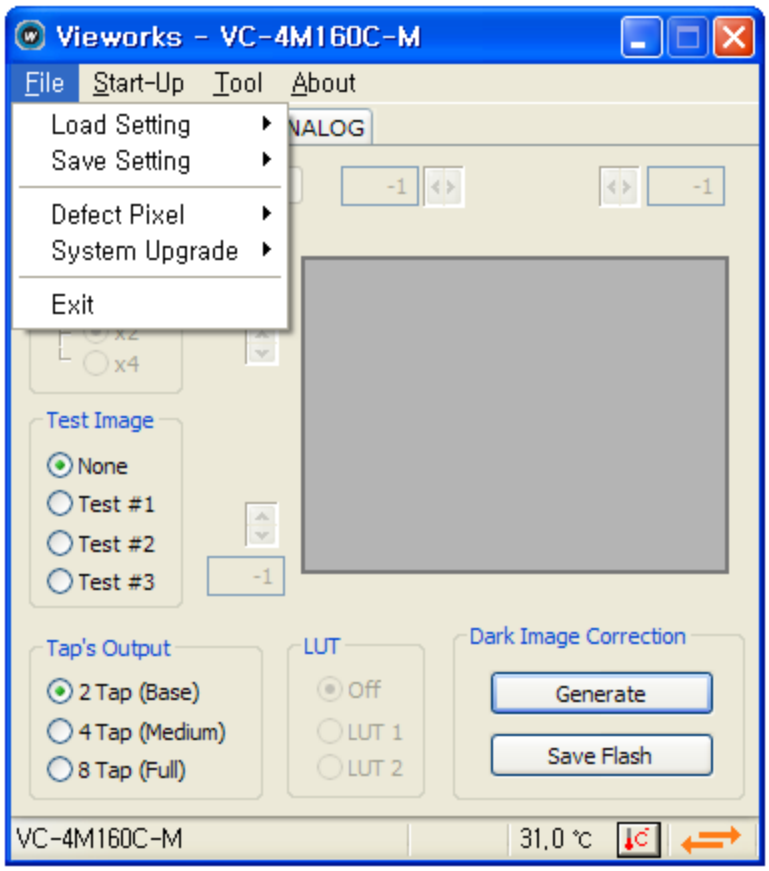


Fig. 8.2 File menu

- **Load Setting** : load setting value of camera, from setting value storage space(Factory, User1, User2) inside the camera or file in the computer.
- **Save Setting** : save setting value of camera in setting value storage space(User1, User2) inside the camera or file in the user computer.
- **Defect Pixel** : not supported in VC Series.
- **System Upgrade** : upgrade MCU program or FPGA logic.
- **Exit** : exit program.

8.3.2.2. Start-Up

The menu to select the space to load the setting value from, when the camera is turned on.

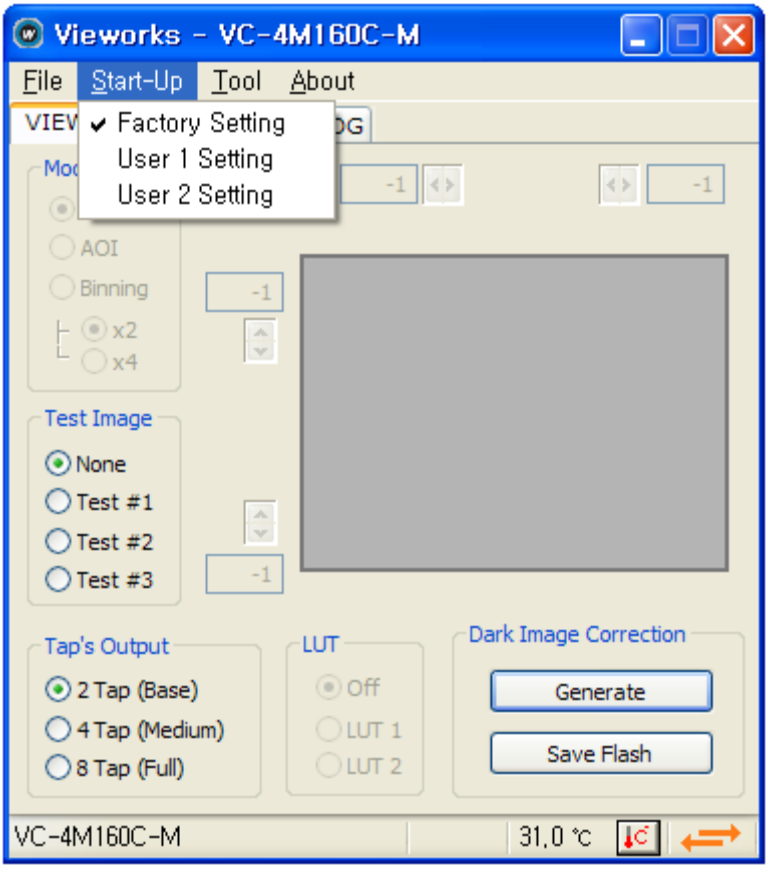


Fig. 8.3 Start-Up menu

- **Factory Setting** : load the setting value from Factory space when camera is turned on.
- **User1 Setting** : load the setting value from User1 space when camera is turned on.
- **User2 Setting** : load the setting value from User2 space when camera is turned on.

8.3.2.3. Tool

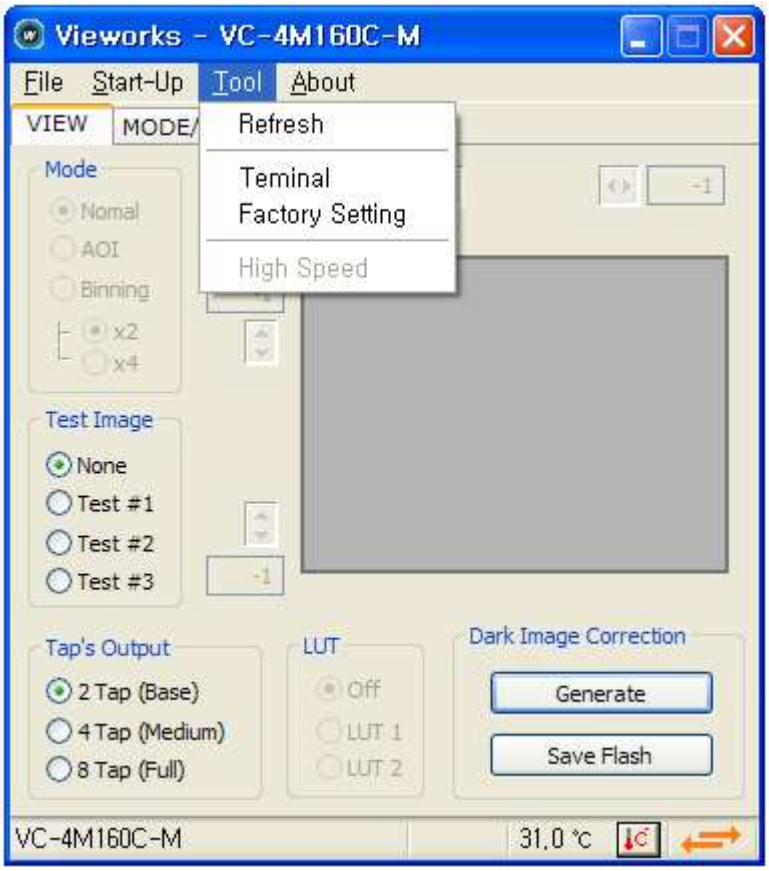


Fig. 8.4 Tool menu

- **Refresh** : Read the current setting value of camera and display on program.
- **Terminal** : Display user command in GUI in terminal. Click to display the terminal window on the lower part of program and click again to hide Terminal window.
- **High Speed** : Not supported in VC Model.

8.3.2.4. Help

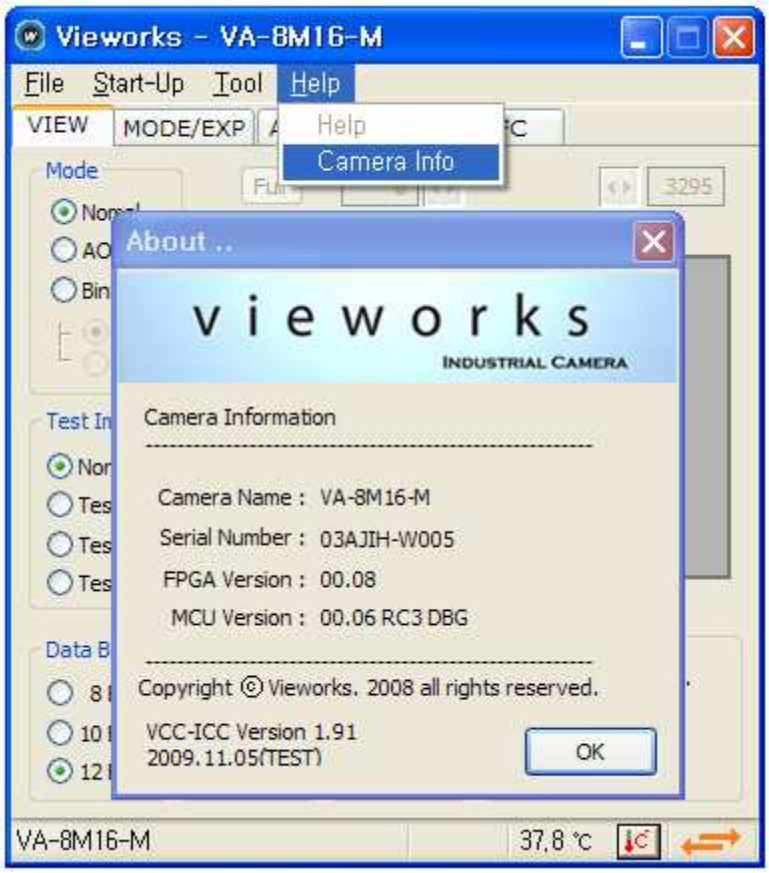


Fig. 8.5 About menu

- **Camera Info** : display camera information (product name, serial number, version, etc.).

8.3.3. Tab

8.3.3.1. VIEW tab

This tab is to control overall functions of camera.

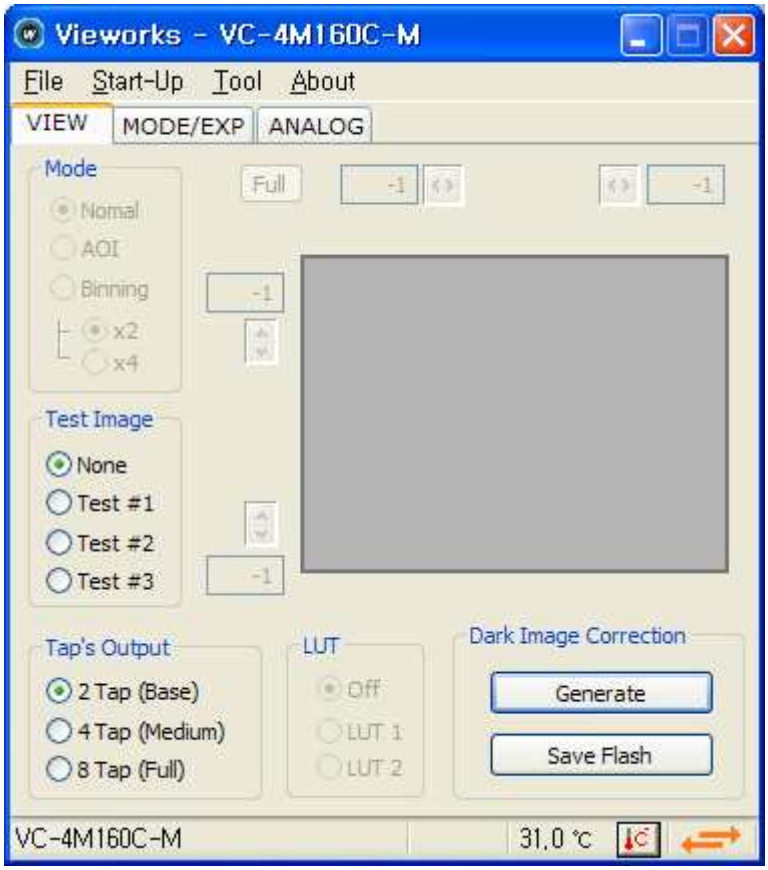


Fig. 8.6 VIEW Tab

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- **Test Image** : select whether to apply test image and the type of test image.
- **Tap's Output** : set camera link(Camera-Link) output mode.(Only VC-4MC-M/C110 Model)
- **Dark Image Correction** : correct Fixed Pattern Noise at camera dark image

8.3.3.2. MODE/EXP tab

This tab is to set Trigger mode, exposure time and Strobe setting.

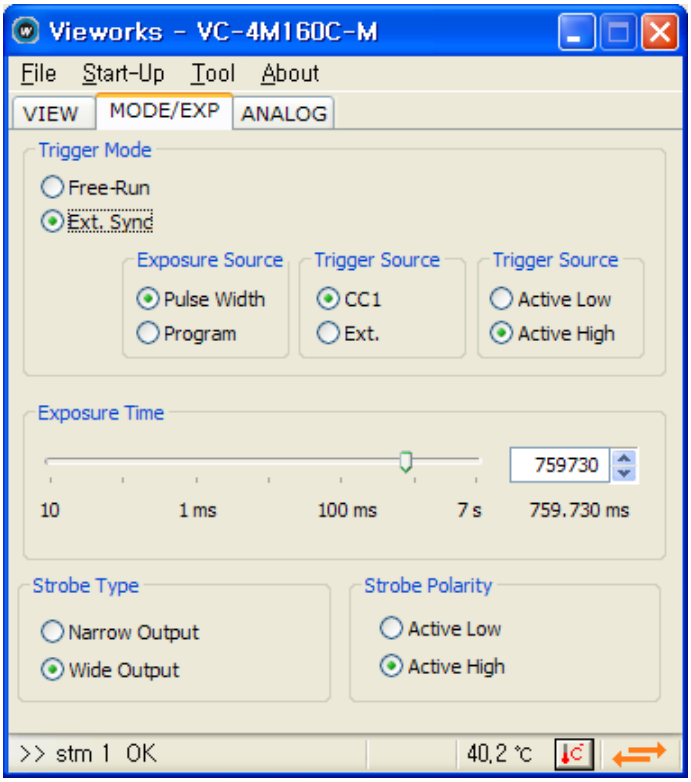


Fig. 8.7 MODE/EXP Tab

- **Trigger Mode** : set the Trigger mode.
- **Exposure** : select Exposure source.
- **Source** : select Trigger source.
- **Polarity** : select polarity of Trigger input.
- **Exposure Time** : set the exposure time to be applied in Free-Run mode and when exposure source is set in program.
- **Strobe Type** : set Strobe Type.
- **Strobe Polarity** : set polarity of strobe output signal.

8.3.3.3. ANALOG tab

This tab is to set gain and Offset setting of image.

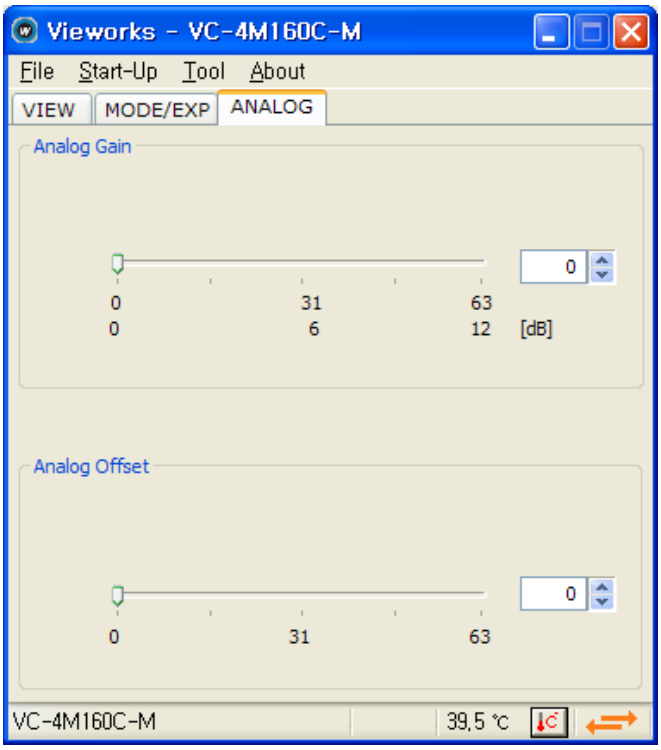


Fig. 8.8 ANALOG Tab

- **Analog Gain** : set gain value.
- **Analog Offset** : set offset value.

9. Mechanical Specifications

9.1. Camera Dimensions

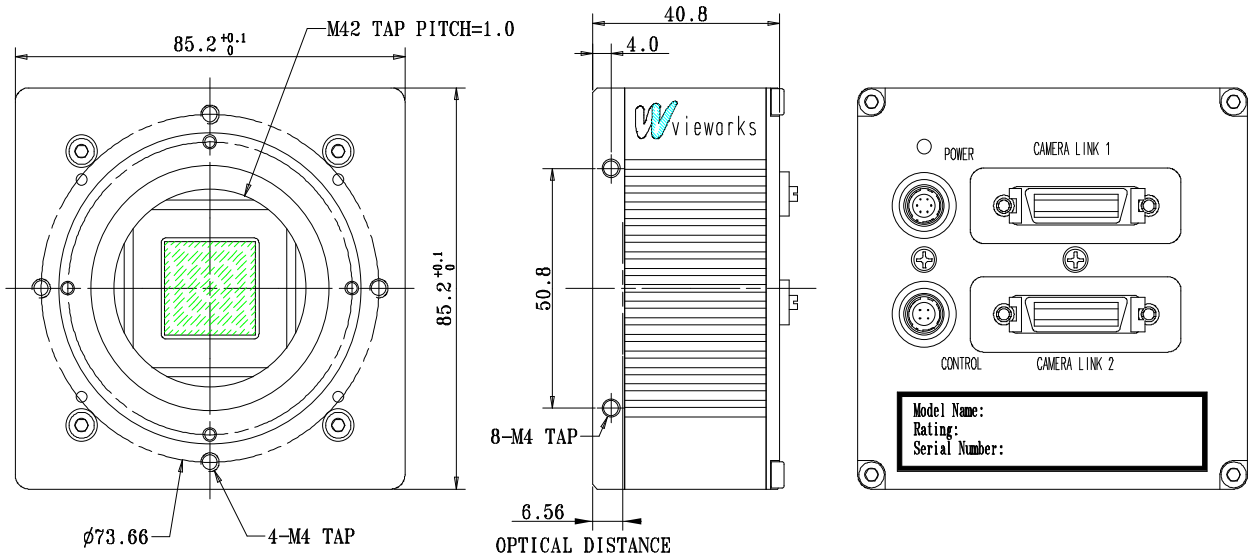
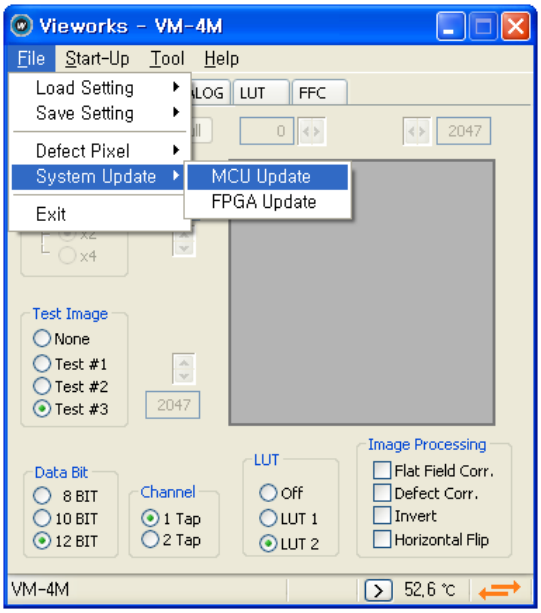


Fig. 9.1 VC Mechanical Dimensions (in mm)

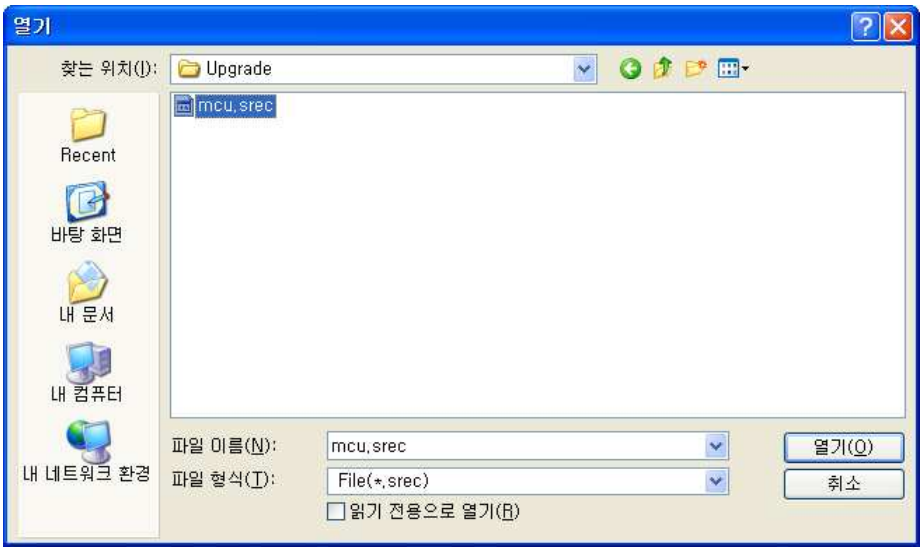
Appendix A Field Upgrade

A.1 MCU

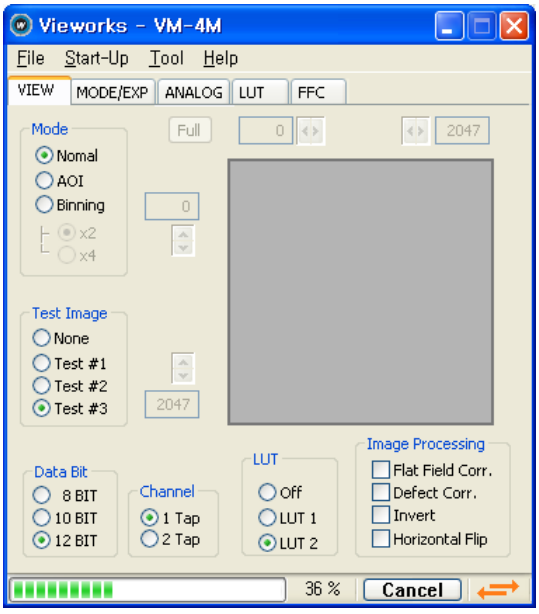
1. Select File -> System Update -> MCU Update in the program provided.



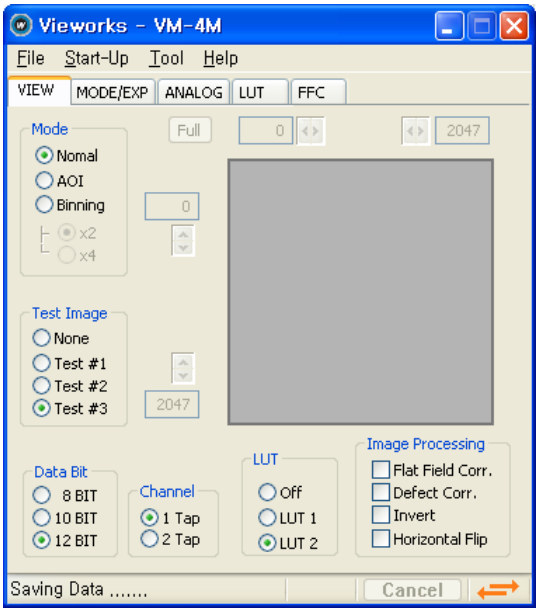
2. Select file MCU update file(*.srec) provided in file dialogue and press Open button.



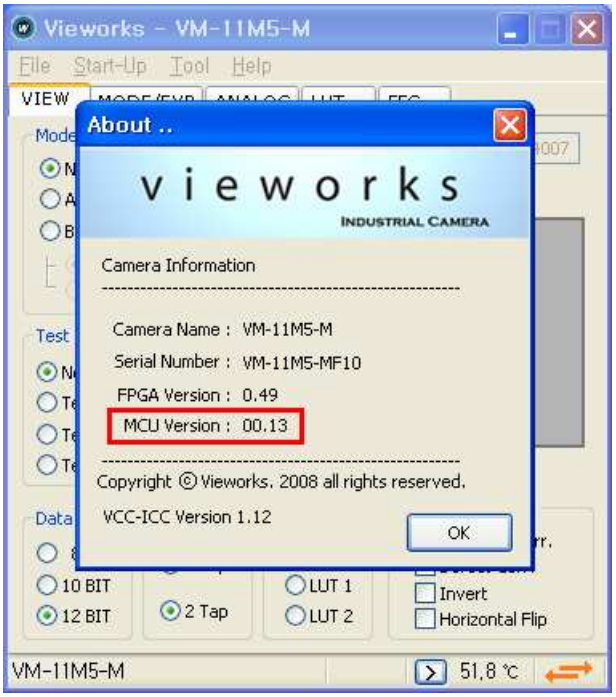
3. Download progress is displayed on the bottom of the program window. Press Cancel button to cancel upgrade. This process may take several minutes.



4. When upgrade file download is completed, it is saved in actual flash. Make sure to be careful so that power cable is not disconnected since camera cannot be restored if it fails in this process.

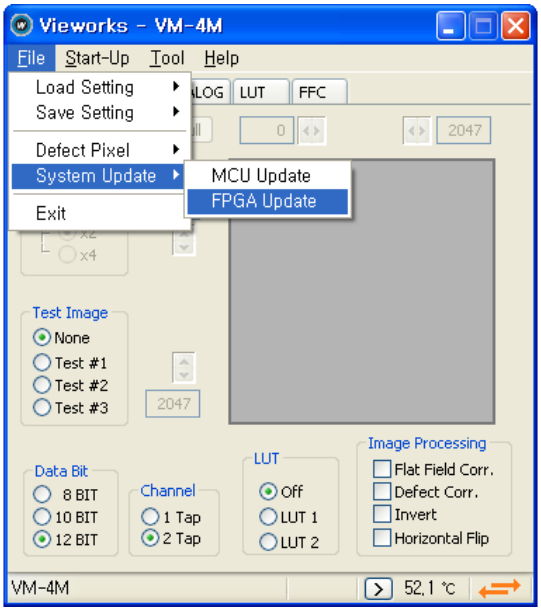


5. When download is completed, turn the power off and on, and click Camera Info under Help menu to see whether MCU version is properly changed.

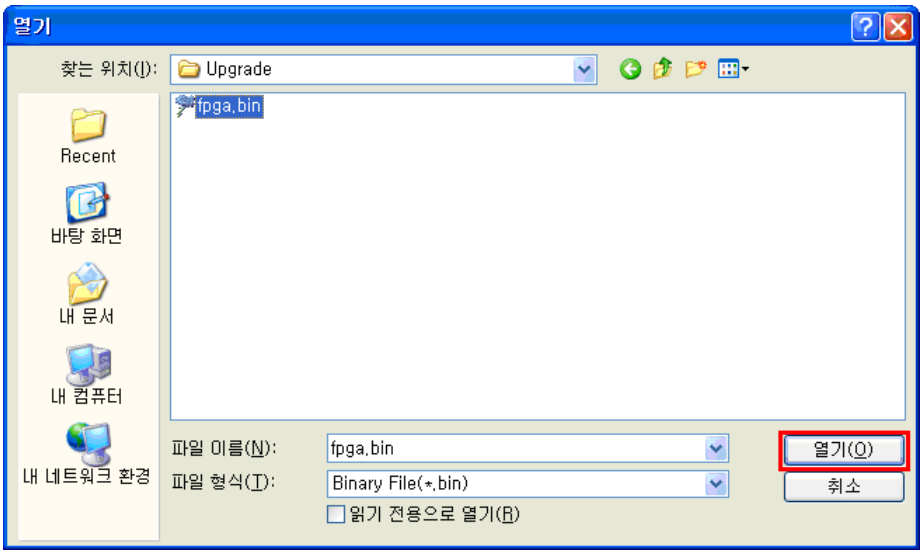


A.2 FPGA

1. Select File -> System Update -> FPGA Update in the program provided.



2. Select FPGA update file(*.bin) provided in file dialogue and then press Open button.



3. The process after this is same as that of MCU upgrade.